Claims: I claim:

1. A process for continuously removing ions from solution in proportion to their prevalence in solution using an ion exchange media, said process comprising:
    a. mixing a regenerated ion exchange media and a feed solution containing diverse ions to produce a reactant slurry;
    b. reacting said reactant slurry in a reaction volume to produce a product slurry comprised of a loaded ion exchange media and a product solution;
    c. separating the loaded ion exchange media from said product slurry;
    d. regenerating said loaded ion exchange media by counter current contact with a regenerant to produce said regenerated ion exchange media; and
    e. conducting the hereinabove listed process steps continuously and concurrently whereby a continuous circuit is produced for dosing, loading, separating, and regenerating said ion exchange media, and for removing ions from said feed solution in a single pass through said reaction volume.
2. The process of claim **1** wherein said ion exchange media is continuously circulated at a predetermined rate.
3. The process of claim **1** wherein said regenerated ion exchange media is continuously mixed with said feed solution in a predetermined stoichiometric ratio.
4. The process of claim **1** wherein said reactant slurry is reacted for a predetermined contact time.
5. The process of claim **4** wherein said predetermined contact time is less than a contact time required to achieve equilibrium loading of a circulating ion exchange media.
6. The process of claim **1** wherein said ion exchange media is partially loaded when it is separated from said product slurry.

7. A process for continuously and preferentially removing monovalent cations from a feed solution containing both monovalent and multivalent cations using cation exchange media, said process comprising:

    a. mixing a regenerated cation exchange media and said feed solution containing diverse cations to produce a reactant slurry;

    b. reacting said reactant slurry in a reaction volume to produce a product slurry comprised of a partially loaded cation exchange media and a product solution;

    c. separating said partially loaded cation exchange media from said product slurry;

    d. regenerating said partially loaded cation exchange media by counter current contact with a regenerant to produce said regenerated cation exchange media; and

    e. conducting the hereinabove listed process steps continuously and concurrently whereby a continuous circuit is produced for dosing, partially loading, separating, and regenerating said cation exchange media, and for preferentially removing said monovalent cations from said feed solution in a single pass through said reaction volume.

8. The process of claim **7** wherein said feed solution is classified as a sodic water.

9. The process of claim **8** wherein said cation exchange resin is circulated at a predetermined rate as needed to preferentially remove monovalent ions from said sodic water, whereby said product solution is not sodic.

10. The process of claim **7** wherein said reactant slurry is reacted for a predetermined contact time.

11. The process of claim **10** wherein said predetermined contact time is achieved by adjusting the flow rate of said feed solution.

12. The process of claim **10** wherein said predetermined contact time is achieved by adjusting the magnitude of said reaction volume.

13. An apparatus for continuously removing ions from solution in proportion to their prevalence in solution using an ion exchange media, said apparatus comprising:

    a. a first means for mixing a regenerated ion exchange media and a feed solution containing diverse ions to produce a reactant slurry;

    b. a second means for reacting said reactant slurry in a reaction volume to produce a product slurry comprised of a loaded ion exchange media and a product solution;

    c. a third means for separating said loaded ion exchange media from said product slurry;

    d. a fourth means for transferring said reactant slurry through said reacting second means, and transferring the resulting product slurry into said separating third means;

    e. a fifth means for regenerating said loaded ion exchange media by counter current contact with a regenerant to produce said regenerated ion exchange media;

    f. a sixth means for transferring said loaded ion exchange media from said separating third means to said regenerating fifth means;

    g. a seventh means for transferring said regenerated ion exchange media from said regenerating fifth means to said mixing first means;

14. The apparatus of claim **13** wherein said mixing first means and said reacting second means are performed together in a common reactor.

15. The apparatus of claim **14** wherein said common reactor is a fluidized bed reactor.

16. The apparatus of claim **15** wherein said fluidized bed reactor is provided with means to adjust the distance between the fluid distributor and the bottom of the

media elutriation line, whereby said reaction volume can be adjusted to achieve desired residence time of said reaction slurry.

17. The apparatus of claim **13** wherein said separating third means is selected from the group consisting of gravity settlers and sieves and hydrocyclones.

18. The apparatus of claim **13** wherein said sixth means and said seventh means for transferring said ion exchange media are a secondary rotary valve and a primary rotary valve respectively.

19. The apparatus of claim **18** wherein said primary rotary valve and said secondary rotary valve are substantially identical in design and dimension.

20. The apparatus of claim **19** wherein means are provided to drive said secondary rotary valve at a rotation speed that always exceeds the rotation speed of said primary rotary valve by a predetermined amount, whereby the rotational speed of said primary rotary valve controls overall rate of circulation of said ion exchange media.